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(54) Optical disk and method of playback

(57) In an optical disk storing digital image information in the form of a succession of blocks, each comprising a plurality of frames comprising I-, P- and B-pictures, wherein an address format is preformatted in front of the block of image information of said plurality of frames, and the data arrangement within each image information blocks is such that I- and P-pictures are collectively disposed. The position of the I-pictures within each block is shifted from one block to another. The I-picture data may be divided into fraction according to the position on the screen, the DCT frequency, or layering, and the fractional I-picture data may be arranged in the image information blocks, and a header or parity signal is recorded in front of each fractional I-picture data. With such a configuration, it is possible to increase the speed of fast playback, and realize smooth playback picture.

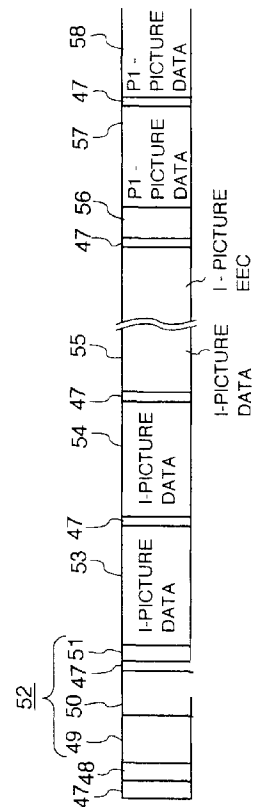


FIG. 2A



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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 4420

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 579 514 A (KABUSHIKI KAISHA TOSHIBA) * page 5, line 8 - line 34; figure 7 * ---	1,2,10	H04N5/926 H04N9/804
A	"SID INTERNATIONAL SYMPOSIUM. DIGEST OF TECHNICAL PAPERS." 17 May 1992, SOCIETY FOR INFORMATION DISPLAY, PLAYA DEL REY (CA) XP000479004 190220 * page 123, column 1, line 26 - column 2, line 46; figure 1 * ---	1,2,10	
A	IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, vol. 38, no. 4, November 1992, NEW YORK US, pages 910-920, XP000324653 J. VAN DER MEER: "The Full Motion System for CD-I." * page 912, column 2, line 1 - line 30 * * page 913, column 1, line 38 - page 914, column 2, line 8 * ---	1,2	
X	---	10,12	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
X	EP 0 396 285 A (SONY CORPORATION) * column 5, line 58 - column 12, line 45 * * column 20, line 10 - column 22, line 28; figures 1-5,8,9A-10B * ---	10	H04N
A	US 5 212 742 A (NORMILE ET AL.) * column 5, line 30 - column 7, line 31 * * column 13, line 57 - column 16, line 12; figures 1-3,7A-8A * ---	1,2,10	
A	EP 0 545 323 A (SONY CORPORATION) * the whole document * ---	1,2	
X	---	10,12	
	-/--		
The present search report has been drawn up for all claims			

EPO FORM 150 (3.82 (IP/C/CO))

Place of search THE HAGUE	Date of completion of the search 15 May 1996	Examiner VERLEYE, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid.
namely claims:
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet -B-

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid.
namely claims:
- None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims.

namely claims: 1-6



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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 4420

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 931 879 A (KOGA ET AL.) * column 19, line 7 - column 21, line 42; figures 8-14 *	1,2	
X	---	10	
A	EP 0 536 630 A (KABUSHIKI KAISHA TOSHIBA) * page 16, line 17 - page 17, line 55 * * page 36, line 15 - line 35 * * page 59, line 20 - page 60, line 23; figures 9-29,58-133 *	1,2,10	
X	-----	12	
The present search report has been drawn up for all claims.			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Place of search THE HAGUE		Date of completion of the search 15 May 1996	Examiner VERLEYE, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/92 (P/NCN)



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EP 95 30 4420 -B-

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims 1-6:

Method and arrangement for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data, and third picture data obtained by prediction from the first picture data and the second picture data, each information block being characterized by an identification signal. First picture data blocks and second picture data blocks are collectively disposed.

2. Claim 7:

Method and arrangement for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data, and third picture data obtained by prediction from the first picture data and the second picture data, each information block being characterized by an identification signal. Information block identifying data, preformatted in front of the respective information blocks, are aligned on a straight line extending in the radial direction of the disk.

3. Claim 8:

Method for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data and third picture data obtained by prediction from the first and second picture data. A jump destination address for special playback is recorded at the head of each image information block.

4. Claim 9:

Method for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data and third picture data obtained by prediction from the first and second picture data. A scene change indicating signal is recorded at the head of each image information block.

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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

5. Claim 10:

Method and arrangement for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data, and third picture data obtained by prediction from the first picture data and the second picture data, each information block being characterized by an identification signal. To perform fast playback or reverse playback, the operation of searching first picture data by reference to an identifying signal, reading it from the disk, and reproducing it is repeatedly executed.

6. Claims 11,31:

Method and arrangement for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data, and third picture data obtained by prediction from the first picture data and the second picture data, each information block being characterized by an identification signal. To perform fast playback or reverse playback, the operation of searching first picture data by reference to an identifying signal, reading it from the disk, reproducing it and playing back second picture data is repeatedly executed.

7. Claim 12:

Method of playing back an optical disk, wherein the rotational speed of the disk during fast playback or reverse playback, is higher than the rotational speed of the disk during normal playback.

8. Claim 13:

Method of playing back an optical disk, wherein the rotational speed of the disk, during fast playback or reverse playback, is raised in the region in which no data needs to be read, and is lowered in the region in which recorded picture data needs to be read.



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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

9. Claim 14:

Method for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data and third picture data obtained by prediction from the first and second picture data.

The first picture data is divided into fractional picture data for a plurality of regions into which a display screen is divided.

The fractional picture data are arranged in the image information blocks, and a header signal is recorded in front of each fractional picture data.

10. Claims 15,16:

Method and arrangement for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data and third picture data obtained by prediction from the first and second picture data. DCT-encoded first picture data is allocated into a plurality of sub-blocks according to the horizontal and vertical frequencies, and each sub-block is characterised by a header signal recorded in front of it.

11. Claims 17-22:

Method and arrangement for recording digital image information on an optical disk, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data and third picture data obtained by prediction from the first and second picture data. The digital image information is divided into lower-layer data and upper-layer data, and a header signal, characterising the type of data block, is recorded in front of it.

12. Claims 23-27,30:

Digital recording device having motion pictures recorded thereon as a succession of information blocks. Each information block comprises image data and non-image data comprising control data identifying selected parts of the image data to be sequentially replayed during special playback.

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EP 95 30 4420 -B4-

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

13. Claim 28:

Method for recording digital image information, in the form of image information blocks each comprising first picture data, second picture data obtained by prediction from the first picture data and third picture data obtained by prediction from the first and second picture data.

The data is arranged in each information block in such a way that first picture data and second picture data can be read sequentially without reading the third picture data.

14. Claim 29:

Method and arrangement for recording digital image information in the form of image information blocks each comprising first picture data and second picture data obtained by prediction from the first picture data. The order of arrangement of the first and second picture data is different between adjacent information blocks.